

F-22 Raptor

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Mission

The F-22 Raptor is the Air Force's newest fighter aircraft. Its combination of stealth, supercruise, maneuverability, and integrated avionics, coupled with improved supportability, represents an exponential leap in warfighting capabilities.

The Raptor performs both air-to-air and air-to-ground missions allowing full realization of operational concepts vital to the 21st century Air Force.

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The F-22, a critical component of the Global Strike Task Force, is designed to project air dominance, rapidly and at great distances and defeat threats attempting to deny access to our nation's Air Force, Army, Navy and Marine Corps. The F-22 cannot be matched by any known or projected fighter aircraft.

Features

A combination of sensor capability, integrated avionics, situational awareness, and weapons provides first-kill opportunity against threats. The F-22 possesses a sophisticated sensor suite allowing the pilot to track, identify, shoot and kill air-to-air threats before being detected. Significant advances in cockpit design and sensor fusion improve the pilot's situational awareness. In the air-to-air configuration the Raptor carries six AIM-120 AMRAAMs and two AIM-9 Sidewinders.

The F-22 has a significant capability to attack surface targets. In the air-to-ground configuration the aircraft can carry two 1,000-pound GBU-32 Joint Direct Attack Munitions internally and will use on-board avionics for navigation and weapons delivery support. In the future air-to-ground capability will be enhanced with the addition of an upgraded radar and up to eight small diameter bombs. The Raptor will also carry two AIM-120s and two AIM-9s in the air-to-ground configuration.

Advances in low-observable technologies provide significantly improved survivability and lethality against air-to-air and surface-to-air threats. The F-22 brings stealth into the day, enabling it not only to protect itself but other assets.

The F-22 engines produce more thrust than any current fighter engine. The combination of sleek aerodynamic design and increased thrust allows the F-22 to cruise at supersonic airspeeds (greater than 1.5 Mach) without using afterburner -- a characteristic known as supercruise. Supercruise greatly expands the F-22's operating envelope in both speed and range over current fighters, which must use fuel-consuming afterburner to operate at supersonic speeds.

The sophisticated F-22 aerodesign, advanced flight controls, thrust vectoring, and high thrust-to-weight ratio provide the capability to outmaneuver all current and projected aircraft. The F-22 design has been extensively tested and refined aerodynamically during the development process.

The F-22's characteristics provide a synergistic effect ensuring F-22A lethality against all advanced air threats. The combination of stealth, integrated avionics and supercruise drastically shrinks surface-to-air missile engagement envelopes and minimizes enemy capabilities to track and engage the F-22. The combination of reduced observability and supercruise accentuates the advantage of surprise in a tactical environment.

The F-22 will have better reliability and maintainability than any fighter aircraft in history. Increased F-22 reliability and maintainability pays off in less manpower required to fix the aircraft and the ability to operate more efficiently.

Background

The Advanced Tactical Fighter entered the Demonstration and Validation phase in 1986. The prototype aircraft (YF-22 and YF-23) both completed their first flights in late 1990. Ultimately the YF-22 was selected as best of the two and the engineering and manufacturing development effort began in 1991 with development contracts to Lockheed/Boeing (airframe) and Pratt & Whitney (engines). EMD included extensive subsystem and system testing as well as flight testing with nine aircraft at Edwards Air Force Base, Calif. The first EMD flight was in 1997 and at the completion of its flight test life this aircraft was used for live-fire testing.

The program received approval to enter low rate initial production in 2001. Initial operational and test evaluation by the Air Force Operational Test and Evaluation Center was successfully completed in 2004. Based on maturity of design and other factors the program received approval for full rate production in 2005. Air Education and Training Command, Air Combat Command and Pacific Air Forces are the primary Air Force organizations flying the F-22. The aircraft designation was the F/A-22 for a short time before being renamed F-22A in December 2005.

General characteristics

Primary function: air dominance, multi-role fighter

Contractor: Lockheed-Martin, Boeing

Power plant: two Pratt & Whitney F119-PW-100 turbofan engines with afterburners and two-dimensional thrust vectoring nozzles.

Thrust: 35,000-pound class (each engine)

Wingspan: 44 feet, 6 inches (13.6 meters)

Length: 62 feet, 1 inch (18.9 meters)

Height: 16 feet, 8 inches (5.1 meters)

Weight: 43,340 pounds (19,700 kilograms)

Maximum takeoff weight: 83,500 pounds (38,000 kilograms)

Fuel capacity: internal: 18,000 pounds (8,200 kilograms); with 2 external wing fuel tanks: 26,000 pounds (11,900 kilograms)

Payload: same as armament air-to-air or air-to-ground loadouts; with or without two external wing fuel tanks.

Speed: mach two class with supercruise capability

Range: more than 1,850 miles ferry range with two external wing fuel tanks (1,600 nautical miles)

Ceiling: above 50,000 feet (15 kilometers)

Armament: one M61A2 20-millimeter cannon with 480 rounds, internal side weapon bays carriage of two AIM-9 infrared (heat seeking) air-to-air missiles and internal main weapon bays carriage of six AIM-120 radar-guided air-to-air missiles (air-to-air loadout) or two 1,000-pound GBU-32 JDAMs and two AIM-120 radar-guided air-to-air missiles (air-to-ground loadout)

Crew: one

Unit cost: \$143 million

Initial operating capability: December 2005

Inventory: total force, 183

(Current as of September 2015)

Point of Contact

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Air Force officials have received authorization from Congress for more F-22 Raptors. Some 90 Raptors have been delivered to the Air Force to date. The 478th Aeronautical Systems Wing at Wright-Patterson Air Force Base is overseeing the production, delivery and fielding of additional F-22s. (U.S. Air Force photo/Tech. Sgt. Ben Bloker)



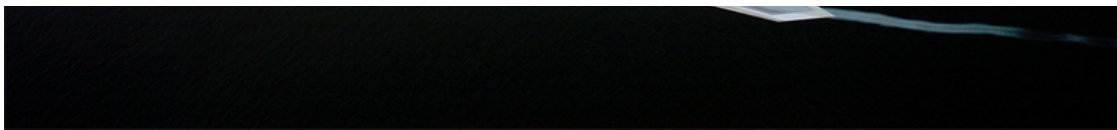


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OVER VIRGINIA -- Lt. Col. James Hecker flies over Fort Monroe before delivering the first operational F-22A Raptor to its permanent home at Langley Air Force Base, Va., on May 12. This is the first of 26 Raptors to be delivered to the 27th Fighter Squadron. The Raptor program is managed by the F-22A System Program Office at Wright-Patterson AFB, Ohio. Colonel Hecker is the squadron's commander. (U.S. Air Force photo by Tech. Sgt. Ben Bloker)



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F-22A Raptor Demonstration Team aircraft maintainers prepare to launch out Maj. Paul "Max" Moga, the first F-22A Raptor demonstration team pilot, July 13. (U.S. Air Force photo/Senior Airman Christopher L. Ingersoll)





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